

A second disadvantage of the solution in question consists in the fact that the ends of the electrodes are freely immersed in the molten bath, resulting in a high intensity of current in the vicinity of the said ends. For this reason, the immersed ends of the electrodes are subject to rapid wear.

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Disclosure of the invention

A main object of the present invention is that of eliminating the drawbacks mentioned above by providing a method and a furnace for the production of 10 vitreous mosaic materials, ceramic frits and similar products as well as for the vitrification of waste, which have the characteristics of low-cost and limited impact on the environment.

A particular object is that of providing a cold-crown furnace which is able to lower 15 the temperature and the quantity of polluting substances contained in the fumes discharged into the atmosphere.

A further object of the invention is that of providing an electric furnace which allows a reduction in the time required to change the vitrifiable material.

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Another particular object is that of providing an electric furnace which is configured so as to limit the specific power consumption.

These objects, together with others which will appear more clearly below, are 25 achieved, in accordance with claim 1, by a method for melting vitrifiable materials, in particular for the production of vitreous mosaic materials and ceramic frits as well as for the vitrification of waste, where the primary material must be frequently changed, comprising the steps of providing a melting tank having a floor and side walls made of refractory material for containing a molten bath, with a 30 predetermined head and at least one channel for discharging the molten materials, introducing a primary batch of vitrifiable materials into said tank via an entry mouth thereof, providing, inside said tank, a plurality of electrodes having a

predetermined shape and position so as to melt completely said vitrifiable materials by means of diffused electric currents, depositing a covering layer of vitrifiable materials in the solid state onto the upper surface of said molten bath so as contain the dispersion of heat from the bath and screen the crown of the
5 furnace, characterized in that said electrodes are positioned so as to rest on said floor over the entire length thereof so as to reduce to a minimum the head of the molten bath.

As a result of this method, it will be possible to reduce the time required for
10 changing the primary batch and the power consumption.

According to a further aspect, the invention provides an electric furnace for melting vitrifiable materials, in particular for the production of vitreous mosaic materials and ceramic frits as well as for the vitrification of waste, where the primary material
15 is frequently changed, said furnace in accordance with claim 5 comprising a melting tank for containing a molten bath with floor and side walls, channels for discharging the molten materials, a crown situated above the floor, means for introducing into the tank a primary batch of vitrifiable materials and for depositing a covering layer on the molten bath, and a plurality of electrodes with a
20 predetermined shape and position, situated inside the tank so as to melt completely the vitrifiable materials by means of diffused electric currents. The furnace is characterized in that the electrodes substantially rest on the floor so as to reduce to a minimum the head of the molten bath.

- 25 Preferably, the electrodes are substantially cylindrical and straight and have a length at least equal to the distance between the opposite side walls of the tank and are arranged substantially parallel to each other at a given mutual distance so as to optimize the distribution of the electric current inside the molten bath.
- 30 Owing to this characteristic feature it is possible to obtain a homogeneous distribution of the power within the molten bath.

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CLAIMS

1. A method for melting vitrifiable materials (V), in particular for the
5 production of vitreous mosaic materials and ceramic frits as well as for the
vitrification of waste, where the primary material must be frequently changed,
comprising the following steps:

- providing a melting tank (2) having a floor (4) and side walls (5) made of
refractory material for containing a molten bath (3), with a predetermined head (B)
10 and at least one channel (6) for discharging the molten materials;
- introducing a primary batch of vitrifiable materials (V) into said tank (2) via
an entry mouth thereof;
- providing, inside said tank (2), a plurality of electrodes (9) having a
predetermined shape and position so as to melt completely said vitrifiable
15 materials (V) by means of diffused electric currents;
- depositing a covering layer (C) of vitrifiable materials (V) in the solid state
onto the upper surface of said molten bath (3) so as contain the dispersion of heat
from the bath (3) and screen the crown (13) of the furnace;
characterized in that said electrodes (9) are positioned so as to rest on said
20 floor (4) over the entire length thereof so as to reduce to a minimum the head (B)
of the molten bath (3), with a consequent reduction in the time required to change
the primary batch and the power consumption.

2. Method according to Claim 1, characterized in that the volume of the
25 primary batch is limited by containing said head (B) within predetermined values
depending on the diameter of the electrodes (9).

3. Method according to Claim 2, characterized in that said head (B) is kept
within values which are between twice and six times the average diameter of the
30 electrodes (9), with said average diameter being between 1" and 2".

4. Method according to Claim 3, characterized in that the power consumption is less than or equal to 0.6 kWh for each kilogram of glass produced.

5. An electric furnace for implementing the method according to one or more of the preceding claims, comprising:

- a melting tank (2) for containing a molten bath (3) with a floor (4), side walls (5), channels (6) for discharging the molten materials and a crown (13) situated above said floor (4);

10 - means (7) for introducing into said tank (2) a primary batch of vitrifiable materials (V) and for depositing a covering layer (C) on the molten bath (3) having a predetermined head (B);

- a plurality of electrodes with a predetermined shape and position, situated inside said tank (2) so as to melt and keep in the molten state said vitrifiable materials (V) by means of diffused electric currents;

15 characterized in that said electrodes (9) substantially rest on said floor (4) so as to reduce to a minimum the head (B) of the molten bath (3), with a consequent reduction in the time required to change the primary batch and the power consumption.

20 6. Furnace according to Claim 5, characterized in that said electrodes (9) are substantially cylindrical and straight and are arranged substantially parallel to each other.

25 7. Furnace according to Claim 6, characterized in that said electrodes (9) have one longitudinal end rigidly secured to a side wall (5) of the tank and the other longitudinal end in contact with the opposite side wall (5) so as to be slightly compressed or tensioned at the tip.

30 8. Furnace according to Claim 7, characterized in that the mutual distance between said electrodes (9) is determined so as to optimize the distribution of the electric current inside the molten bath (3).

9. Furnace according to Claim 5, characterized in that the side wall (5) of said tank (2) has a minimum height (H) which is greater than the maximum value of the head (B) plus the maximum thickness (S) of said covering layer (C).

5 10. Furnace according to Claim 9, characterized in that said minimum height (H) of the side walls (5) of the tank (2) is between 35 and 60 cm with the diameter of said electrodes between 1" and 2½".

10 11. Furnace according to Claim 10, characterized in that said minimum height (H) is preferably between 40 and 60 cm with the diameter of said electrodes (9) between 1" and 2½".

15 12. Furnace according to Claim 8, characterized in that said discharge channels (6) extend at least partially underneath said electrodes (9) so as not to hinder flowing out of the molten bath (3).

13. Furnace according to Claim 12, characterized in that said discharge channels (6) comprise at least one main receiving canal (10) connected to the outside of the furnace by means of a discharge gully (11).

20 14. Furnace according to Claim 13, characterized in that said discharge channels (6) comprise a plurality of secondary receiving canals (12) connected to said main canal (10).

25 15. Furnace according to Claims 13 and 14, characterized in that said main and secondary canals (10, 120 are transverse to each other and extend completely underneath said electrodes (9).